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USSR ELECTRIC POWER COSTS IN AGRICULTURE

/Numbers in parentheses refer to appended sources./

Although no price schedule exists for the electric power supplied to electric tractors used in agriculture, the price averages 30 kopeks for one kilowatt.(1)

Table 1 breaks down the component costs for one kilowatt-hour of electric power supplies in 1947 by the Sutisskaya GES in Vinnitskaya Oblast, Ukrainian SSR, one of the best consolidated state rural GES. This GES produces 1,200,000 kilowatt-hours during its annual operation of over 3,000 hours. It serves 24 kolkhozes, two MTS, a number of industrial enterprises, and the town of Zhmerinka, and is connected to the high-voltage transmission network of the Vinnitskaya Power System.

Its construction, including a 76.6 kilometer-long high-voltage transmission network and 80 transformer installations, cost 4,750 rubles per kilowatt of its installed capacity, expressed in 1948 prices. The utilization of the GES's capacity is assured by the fact that the total consumers' capacity connected is four times greater than the GES's capacity. The cost of electric power produced by this station should be low -- for example, 10 kopeks for one kilowatt-hour -- but this is not the case. The cost is calculated on the basis shown in Table 1.

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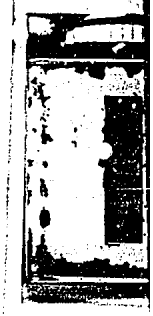


Table 1

Items	Kopeks per Kw-h	Percentage of Total
Basic wages of workmen, additional pay, and premium fund	7.95	27.5
Administrative and operational expenses	8.70	30.0
Current repairs, expenses in connection with spring floods, expendable articles, transportation, labor protection, and safety measures	4.32	14.7
Ammortization	2.58	8.8
Taxes and fees	0.13	0.4
Deductions for higher offices	5.45	18.6
Total	29.13	100.0

Wages and salaries make up over 50 percent of the cost, since 45 persons are working at the GES and the network, at a rate of one person for every 6 kilowatts of the GES's capacity, and one person for every 5 kilometers of the transmission lines.

Table 2 shows the estimated cost and selling price of electric power supplied by the GES for 1947 and actual figures for the first half of the year, in kopeks per kilowatt-hour.

Table 2

	Plan for 1947		Actual	
	Cost	Selling Price	Cost	Selling Price
At the bus-bars of the GES	22.6	25.0	29.13	27.5
At consumers' end	29.95	64.39	29.88	55.56

The above costs were somewhat lowered during 1948 and 1949.

The Korsun' - Shevchenkovskaya GES in Kiyevskaya Oblast is the largest state rural hydroelectric power station, built at a cost of 5,073 rubles per kilowatt of its installed capacity of 1,000 kilowatts. It serves kolkhozes of the rayon, five MTS, a number of industrial enterprises, and the city of Korsun'. Total load on the generators is 4,446 kilowatts, of which electric motors take 3,903 kilowatts. Peak loads occur during harvesting from July to November, and the GES is in operation up to 4,000 hours a year. Food industries, sugar refineries, and state flour mills consume about 71 percent of the GES's output.

Table 3 shows the cost of electric power generated at the Korsun'-Shevchenkovskaya GES.

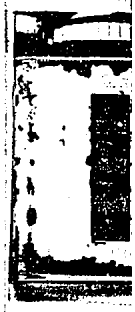


Table 3

	Kopeks per Kw-h	Percentage of Total
Wages	9.35	30.9
Amortization of capital investment	10.22	33.7
Current repairs and transportation	1.12	3.7
Additional pay and labor protection	1.27	4.2
Administrative and operating expenses	4.60	15.2
Deductions, taxes, and fees	2.86	9.4
Others (communications, floods, etc.)	0.88	2.9
Total	30.30	100.0

In this case also, wages and salaries of personnel make up over 50 percent of the cost. There is one person employed for every 12.1 kilowatts of the station's capacity and one person for every 4.6 kilometers of the network.

In Sverdlovskaya Oblast, besides many small hydroelectric stations, there are a number of larger ones of 200 - 1,000-kilowatt capacity. One of them is the Sylvinskaya interkolkhoz GES of 240 kilowatts' capacity which cost 1,010,000 rubles to build, including all its structures, its 680-meter-long stone-earth dam, the water reservoir of 16 million cubic meters, and transmission lines, both high and low voltage, totaling 48 kilometers (4,225 rubles per kilowatt).

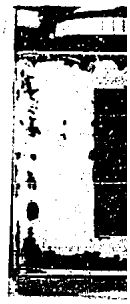
It serves seven kolkhozes, one MTS, a number of industrial enterprises, and the town of Shalinsk. Its generators have a considerable load and are capable of producing up to one million kilowatt-hours a year. The cost of one kilowatt-hour is 22 kopeks. In 1949, the GES produced 582,300 kilowatt-hours.

A great number of small kolkhoz hydroelectric stations are like the one in the large, 1,000-member Kolkhoz imeni Il'yich in Vinnitskaya Oblast. The installed capacity of this GES is 29 kilowatts. Its construction cost, including the step-up transformer station and transmission network but excluding the cost of the labor supplied by the kolkhoz, was 130,500 rubles, or 4,500 rubles per kilowatt of its capacity. Besides money and labor, the kolkhoz supplied a considerable amount of horse-driven transportation facilities during its construction, and used up a great deal of its materials. Since these items are usually responsible for 35 - 45 percent of the total construction cost, it should be estimated that the real cost was not less than 6,000 or 6,500 rubles per kilowatt of the capacity.

The output of the GES is used for lighting only, although the kolkhoz has needed many electric motors in operation since it has been growing grain and sugar beets on over 1,000 hectares of land and has well-developed animal husbandry and truck gardens. However, the small capacity of the GES and the unregulated flow of the river water, which interrupts its operation considerably, would not permit the use of the motors. Consequently, the members of the kolkhoz had to pay 70 kopeks and nonmembers one ruble 40 kopeks for one kilowatt.

Another small kolkhoz GES of 65 kilowatts' capacity was built by "The Day of Harvest" Kolkhoz in Gor'kovskaya Oblast at a cost of 675,000 rubles, i.e., 10,385 rubles per kilowatt of its capacity.

According to the data available in the Ukrainian SSR, the following table based on 1937 prices shows percentage costs of one kilowatt of installed capacity for GES of different capacities.



Capacities of GES (kw)	Construction Cost of One Kw (percent)
10 - 20	100
20 - 50	85
50 - 100	50
100 - 1,000	40
1,000 - 3,000	35

The average capacities of the rural electric power stations built during the postwar Five-Year Plan were increased annually as shown in the table below, in which the average capacities are expressed in percentage of the average capacity for 1946.(2)

	1946	1947	1948	1949	1950
GES	100	126.2	142.3	183.1	210.4
TES	100	101.7	117.2	150.9	134.9
Average for above	100	108.3	129.2	162.5	177.1

SOURCES

1. Moscow, Voprosy Ekonomiki, No 5, May 52

2. S. Matskevich, Rol' elektrificatsii v razvitii material'no-tekhnicheskoy bazy sel'skogo khozyaystva SSSR (Influence of Electrification on Development of Material and Technical Bases in Agriculture of the USSR), Moscow, 1952

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